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White-winged Vampire Bat, *Diaemus youngi* (Jentink, 1893) (Mammalia, Chiroptera): range extension in the Cerrado biome and new locality in Mato Grosso do Sul, southwestern Brazil

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Abstract. We document a new locality of *Diaemus youngi* in the Cerrado biome, extend the distribution in Mato Grosso do Sul state (southwestern Brazil), and present the first record of a vampire bat species from the state's capital, Campo Grande. We recorded one male adult in an urban remnant of Cerrado. There are few locality data for this species in the Cerrado biome and our report significantly adds to the knowledge of this species' distribution within the state and throughout Brazil.

Key words. Bats; distribution; urban area; secondary rainforest; Campo Grande

Brazil presents the second largest diversity of bat species in South America, and up to 9 families, 68 genera, and 178 species have been recorded (Nogueira et al. 2014), but information on the occurrence and distribution of some species is still lacking. This is especially so for areas within the Cerrado domain, such as in the state of Mato Grosso do Sul, which is under anthropogenic threats.

In the most recent checklist of bats from Mato Grosso do Sul, Fischer et al. (2015) recorded 74 species of bats belonging to 42 genera and 7 families. However, for some subfamilies, such as Desmodontinae, occurrences were scarce or recorded from isolated localities, making it difficult to understand the distribution of bat species in Mato Grosso do Sul and in the Cerrado. The subfamily Desmodontinae includes 3 species (*Desmodus rotundus* (Geoffroy, 1810), *Diphylla ecaudata* Spix, 1823, and *Diaemus youngi* (Jentink, 1893), with hematophagous feeding behavior. (Greenhall & Schutt 1996).

Diaemus youngi (Jentink, 1893) preferably feeds on the blood of birds (Uieda 1993). It is rare throughout Brazil (e.g., Aguiar et al. 2006; Greenhall & Schutt 1996), and therefore, information on its conservation, biology, and ecology is important (Costa et al. 2008). Here, we report a new locality record of *D. youngi* in the Cerrado and extend its distribution. This represents the first record of *D. youngi* and a hematophagous bat species from Campo Grande, the state's capital.

We captured the specimen at the São Vicente Institute (20°23′08.5″ S, 054°36′28.8″ W), in the municipality of Campo Grande, capital of Mato Grosso do Sul state. The institute has an area of 191 ha, of which 20 ha are designated as legal reserve and about 30 ha are used for farming of crops such as corn, beans, and soy (Cerezoli et al. 2014). Additionally, at the site there is a fish pond for fish farming and livestock (e.g., cattle, goats, sheep, and horses) are raised (Cerezoli et al. 2014). The study area is characterized as a remnant of the Cerrado biome within an urban area.

In November 2016 we captured the specimen with a permanent license (number 10.566) issued by the Instituto Brasileiro de Meio Ambiente (IBAMA). We used 6 mist nets (9.0 m × 3.0 m) at a height of 0.5 m above the ground and maximum height of 3.5 m. These were distributed on trails, in clearings, and at the edges of and inside the remnant. The individual captured

Figure. 1. The individual *Diaemus youngi* (Jentink, 1893) captured in the present work. (Photographed by Allan Corral).

Figure. 2. The arrows show the main external morphological features of *Diaemus youngi* (Jentink, 1893): the ear edges and wings are white, as well as the membrane between the second and third fingers. (Photographed by Allan Corral).

was deposited in the zoological reference collection of Universidade Federal de Mato Grosso do Sul (ZUFMS) with the voucher code ZUFMS-CHI02310.

To identify the specimen we followed diagnoses of Reis et al. (2007) and the key by Gardner (2008). The male adult specimen captured was identified as *D. youngi* (Figure 1). According to Reis et al. (2007), *D. youngi* resembles *Desmodus rotundus* (E. Geoffroy 1810) and *Diphylla ecaudata* Spix, 1823, but can be easily distinguished from these other vampire bats because it lacks a calcar and has no evident tail. The thumb of *D. youngi* has a single pad while *D. rotundus* has 2 pads (Aguiar et al. 2006). In *D. youngi,* both sexes possess cup-shaped oral scent glands located bilaterally inside the mouth. These scent glands are only seen when the bat is disturbed and directs the glands forward and emits an offensive odor (Greenhall & Schutt 1996). Other features that clearly distinguish *D. youngi* from other vampire bats are the white edges of its ears and wings, as well as the white membrane between the second and third fingers (Greenhall & Schutt 1996) (Fig. 2).

Up to 2006 only 3 records of *D. youngi* were recorded in the Cerrado (Aguiar et al. 2006); ours is the tenth record from the Cerrado (Fig. 3). Within Mato Grosso do Sul, our record is 143 km away from the closest locality recorded for this species in state. Most of the known records of *D. youngi* are distributed in the Pantanal biome (7 localities), with only 2 localities in the Cerrado of the Mato Grosso do Sul (Fischer et al. 2015), and ours is the third record from the Cerrado of the state.

Campo Grande has an area of 8,092,951 (km²) and 863,982 inhabitants (IBGE 2016). The capture location is considered an area of transition between urban and periurban perimeters, with some housing complexes and neighborhoods nearby.

The capture of this species in an urban area should alert us to the possibility of potential contact with humans, which was emphasized by Ito et al. (2016) who reported human blood in the diet of *Diphylla ecaudata*. However, species like *D. youngi* are considered specialists for bird blood, so while the habitat fragmentation and loss can negatively affect the availability of natural prey, conversion of natural landscape to livestock farming can greatly increase the availability of introduced prey (Bobrowiec et al. 2015). Hence, vampire bats may favor some degree of environmental disturbance, especially when such disturbances lead to an increase in the availability of domesticated animals, such as chickens, goats, and cows (Fenton et al. 1992, Gomes et al. 2010).

The process of habitat fragmentation in Mato Grosso do Sul can have varying consequences for the regional biodiversity, by changing species abundance and increasing the abundance of species adapted to anthropic environments (Willig et al. 2007). We also understand that the presence of *D. youngi* in an urban area of Cerrado may be due to the destruction of caves, habitat, and deforestation in nearby fragmented areas, which may cause these bats to inhabit new urban environments (Pacheco et al. 2010).

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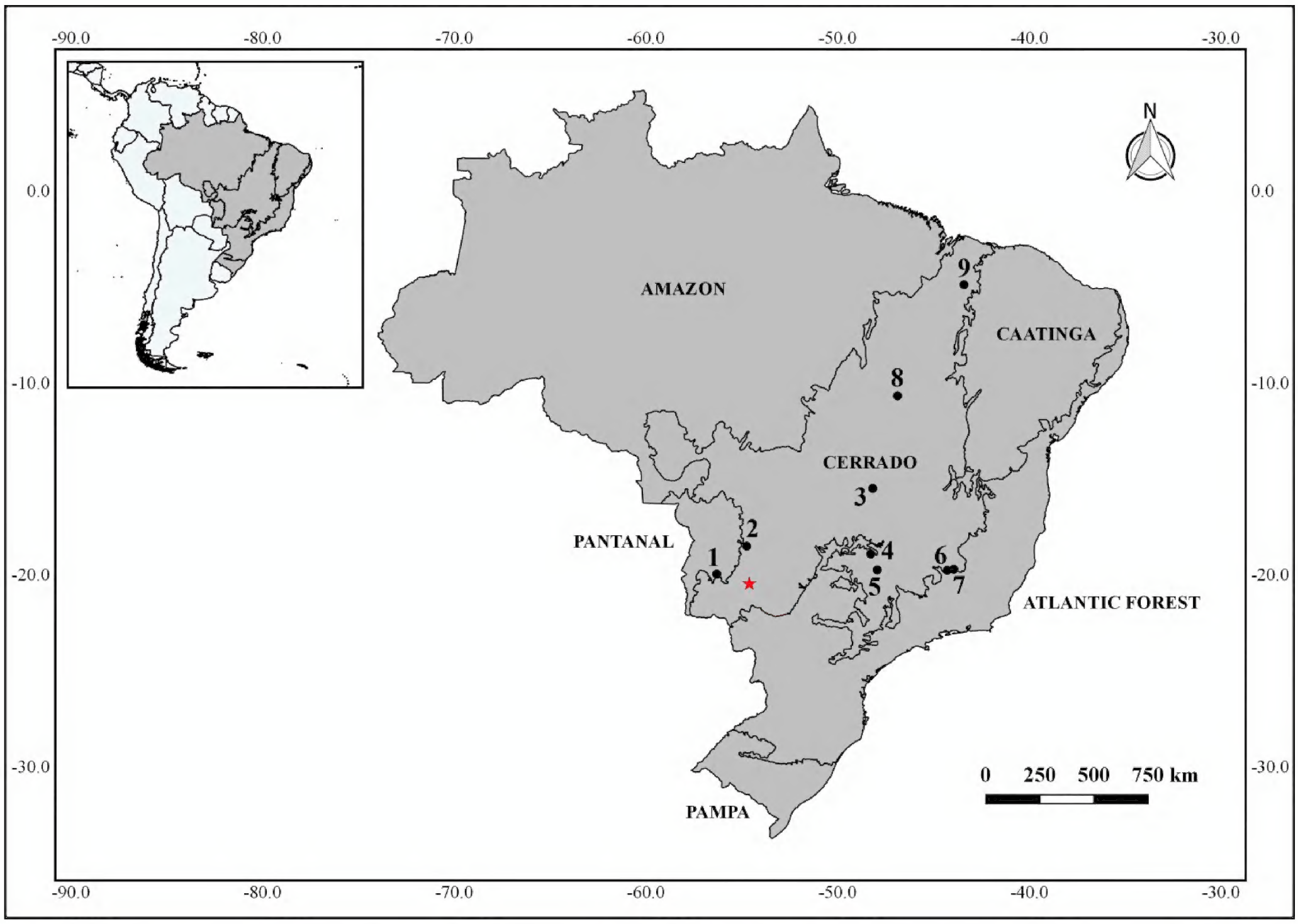

Figure 3. Distribution of *Diaemus youngi* (Jentink, 1893) in the Cerrado biome. Red star: new locality. Black circles 1–9: other localities, in Table 1. Geodetic datum used: WGS84.

Table 1. Localities (numbers correspond to Figure 3) and specimens of *Diaemus youngi* in Cerrado, Brazil. State abbreviations: MS, Mato Grosso do Sul; DF, Distrito Federal; MG, Minas Gerais; TO, Tocantis; MA, Maranhão.

Number	Locality	State	Source	Latitude (S)	Longitude (W)
1	Caimã Farm and resort	MS	Alho et al. (2011)	19°18′13.3″	056°01′24.5″
2	Coxim city	MS	Fischer et al. (2015)	18°33′45.04″	054°47′01.70″
3	Brazlândia city	DF	Aguiar et al. (2006)	15°30′	048°10′
4	Uberlândia city	MG	Uieda & Araújo (1987)	18°55′18.06″	048°16′30.60″
5	Uberaba city	MG	Ututz et al. (2004)	19°44′59.76″	047°56′20.20″
6	Esmeraldas city	MG	Uieda (1993)	19°45′56.70″	044°17′08.80″
7	São José da Lapa city	MG	Torquetti et al. (2013)	19°42′44.72″	043°56′44.60″
8	Mateiros city	TO	Gregorin et al. (2011)	10°40′47.36″	046°52′46.90″
9	APA Inhamum	MA	Olímpio et al. (2016)	04°53′29.81″	043°24′48.70″
10	Campo Grande city (red star)	MS	This study	20°23′08.5″	054°36′28.8″

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